

Written by: Aliya Ware

Team: //TODO

Last Modified: Nov 2. 2021

## **Programmer Documentation**

This file contains snippets of code from each major component of our project. The code segments are all prefaced with what that piece of code does in our project. Some files of code were too long for this document so I chose to include the beginning snippet of it. All code blocks are separated by a line of "--".

'''

code: This is the algorithm driving Traveler. Prim's Algorithm is implemented utilizing a min-heap structure on an adjacency list.

group: //TODO

author(s): Thomas Joyce

last modified: 26 Oct 2021

'''

from collections import defaultdict

class Edge:

def \_\_init\_\_(self, val=None, a\_vertex=None, b\_vertex=None):

self.weight = val

self.a = a\_vertex

self.b = b\_vertex

class EdgeMinHeap:

def \_\_init\_\_(self):

self.heap = []

def heapify(self, index):

minimum = index

```
left = 2 * index + 1 # left(node) index
right = 2 * index + 2 # right(node) index
# value at left is minimum ?
```

```
if left < len(self.heap) and self.heap[left].weight < self.heap[index].weight:
    minimum = left
if right < len(self.heap) and self.heap[right].weight < self.heap[minimum].weight:
    minimum = right
if minimum != index:
    self.interchange_vertex(index, minimum)
```

```
def insert(self, edge):
```

```
    if len(self.heap) == 0:
        self.heap.append(edge)
    else:
        self.heap.append(edge)

    for i in range((len(self.heap)//2)-1, -1, -1):
        self.heapify(i)
```

```
def delete(self):
```

```
    self.interchange_vertex(0, len(self.heap)-1) # Exchange 0th index with last index
    min_edge = self.heap.pop() # pop last element
    for i in range((len(self.heap)//2)-1, -1, -1):
        self.heapify(i)
    return min_edge
```

```
def interchange_vertex(self, index_a, index_b):
```

```
    temp_val = self.heap[index_a].weight
    temp_a = self.heap[index_a].a
    temp_b = self.heap[index_a].b
```

```

self.heap[index_a].weight = self.heap[index_b].weight
self.heap[index_a].a = self.heap[index_b].a
self.heap[index_a].b = self.heap[index_b].b
self.heap[index_b].weight = temp_val
self.heap[index_b].a = temp_a
self.heap[index_b].b = temp_b

```

```

class Graph:

```

```

    def __init__(self, v_count):
        self.V = v_count
        self.graph = defaultdict(list)
        self.min_heap = EdgeMinHeap()

```

```

def solve(matrix):

```

```

    """
    function: builds a graph using input matrix
    input: list[list]
    ex: [[0, 454639, 716226], [455412, 0, 795474], [717739, 811274, 0]]
    output: list[list] #this is the MST path order.
    ex: [[0,1],[1,2],[2,3],[3,4]]
    """

```

```

    g = Graph(len(matrix))

```

```

    #print(g.V)

```

```

    for i in range(len(matrix)):
        for j in range(len(matrix[i])):
            if j != i:
                #print("adding: ", i, j, matrix[i][j])
                g.add_edge(i, j, matrix[i][j])
    return g.mst_order()

```

```

    """

```

```

if __name__ == "__main__":
    g = Graph(4)
    g.add_edge(0, 1, 6)
    g.add_edge(0, 2, 1)
    g.add_edge(0, 3, 2)
    g.add_edge(1, 2, 5)
    g.add_edge(1, 3, 3)
    g.add_edge(2, 3, 4)
    print("MST order:", g.mst_order())
"""

```

---

""" (Snippet)

Filename: app.py

Purpose:

The main application file for the Flask server.

Contains an endpoint '/get\_order' that takes a list of locations, parses them through the google distance matrix api,

creates an adjacency matrix from those distances, parses the matrix through the algorithm, and returns the result.

Authors: Jordan Smith

Group: //Todo

Last modified: 10/29/21

"""

```

import flask

```

```

import json
import urllib
import requests
from login import login_page
from key import API_KEY
import Prims

app = flask.Flask(__name__)
app.register_blueprint(login_page)

###
# Globals
###
base_url = "https://maps.googleapis.com/maps/api/distancematrix/json?"

"""
to_url_string
    Converts the given list of locations to a string with url-encoding
    url-encoding translates " " -> "%20", "," -> "%2C", etc.
    We separate the addresses with "|"
"""

def to_url_string(addr):
    return urllib.parse.quote_plus("|".join(addr))

"""
to_adj_mat
    Converts a given dictionary (from Google Distance Matrix API)
    into an adjacency matrix and returns that matrix
"""

def to_adj_mat(data):
    result = []
    for i, row in enumerate(data['rows']):

```

```

result.append([])
for elem in row['elements']:
    # Each element has distance and time keys
    # Both of those have a value (the raw value in km/sec),
    # and a formatted value (123 Km or 1 hr 20 min)
    result[i].append(elem["distance"]["value"])

return result

```

---

"""

Filename: HomeComponent.js

Purpose:

The main application file to construct the home page and insert google maps' autocomplete feature into the website.

Contains the google maps api key and the google rendering component

Authors: Tamas Hicks

Group: //Todo

Last modified: 10/10/21

"""

```

import React, { Component } from "react";
import { render } from "react-dom";
import { GoogleComponent } from
"react-google-location";

```

```

class HomeComponent extends Component {
  constructor(props) {
    super(props);

```

```

    this.state = {
      place: null,
    };
  }

  render() {
    return (
      <div>
        <GoogleComponent
          apiKey={GOOGLEMAPS_API_KEY}
          language={"en"}
          country={"country:in|country:us"}
          coordinates={true}
          locationBoxStyle={"custom-style"}
          locationListStyle={"custom-style"}
          onChange={(e) => {
            this.setState({ place: e });
          }}
        />
      </div>
    );
  }
}

```

```
export default HomeComponent;
```

---

"" (Snippet)

Filename: MyDirectionsRenderer.js

This component is used to render directions on a google maps component

Written by Tamas Hicks

Team //TODO

last modified on 10/29/21

```
“”””
```

```
import React from "react";
// this is so we can use the react namespace
import {
  GoogleMap,
  useLoadScript,
  DirectionsService,
  DirectionsRenderer,
} from "@react-google-maps/api";
import styled from "styled-components";
// imported styled to do css work in the same file. Eventual refactoring should include this in all
files.
```

```
const libraries = ["places", "directions"];
// this is how we get the map to map to render places and directions
```

```
const mapContainerStyle = {
  // we want the map to fill its entire container. We can't use a styled div, because it's an imported
  component
  width: "100%",
  height: "100%",
  borderRadius: "30px",
};
const center = {
  // centered over eugene. Eventually this should be changed into a prop that accepts user queried
  location via props
  lat: 44.052071,
  lng: -123.086754,
};
```

---

```
””””
```

Filename: CreateAccount.js



Purpose:

This file formats the user login/signup page. It is able to take in user input and scans the database for existing accounts. It can take users from sign in page to the login page through a “create account button”

It will set up users and send that information to the backend for processing and authentication.

It is secured by a hash key

Authors: Evan Paraiser

Group: //Todo

Last modified: 10/24/21

""""

```
import { useState } from "react";
import { Link } from "react-router-dom";
import classes from "../CSS/CreateAccount.module.css";
import { useHistory } from "react-router";
```

```
function CreateAccount() {
  const [userName, setUsername] = useState(null);
  const [password, setPassword] = useState(null);
  const [email, setEmail] = useState(null);
```

```
  const history = useHistory();
```

```
  function usernameChanger(event) {
    setUsername(event.target.value);
  }
```

```
  function passwordChanger(event) {
    setPassword(event.target.value);
  }
```

```
  function emailChanger(event) {
    setEmail(event.target.value);
  }
```

```
  function PostAccount(event) {
    event.preventDefault();
```

```

const accountInfo = {
  method: "POST",
  headers: {
    "Content-Type": "application/JSON",
    Contents: "accountInfo",
  },
  body: JSON.stringify({
    username: userName,
    email: email,
    password: password,
  }),
};

fetch("/create_account", accountInfo).then((response) => {
  if (response.status === 201) {
    history.push("/MainPage");
  } else if (response.status === 409) {
    alert("That user already exists!");
  } else {
    alert("Failed to create profile!");
  }
});
}
return (
  <div className={classes.body}>
    <div className={classes.container}>
      <form className={classes.form} id="createAccount">
        <h1 className={classes.formTitle}>Create Account</h1>

        <div className={classes.form__inputGroup}>
          <input
            onChange={usernameChanger}
            type="username"
            className={classes.form__input}
            autoFocus
            placeholder="Username"
          ></input>
        </div>
        <div className={classes.form__inputGroup}>
          <input

```

```

      onChange={emailChanger}
      type="email"
      className={classes.form__input}
      placeholder="Email Address"
    />
  </div>
  <div className={classes.form__inputGroup}>
    <input
      onChange={passwordChanger}
      type="password"
      className={classes.form__input}
      placeholder="Password"
    />
  </div>
  <button className={classes.form__button} onClick={PostAccount}>
    Continue
  </button>
  <br />
  <br />
  <br />
  <p className={classes.form__text}>
    <Link className={classes.form__link} to="/SignIn">
      Already have an account? Sign in
    </Link>
  </p>
</form>
</div>
</div>
);
}

```

```

export default CreateAccount;

```